

The Big Lie: Human Restoration of Nature

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The trail of the human serpent is thus over everything.

William James, *Pragmatism*

I

I begin with an empirical point, based on my own random observations: the idea that humanity can restore or repair the natural environment has begun to play an important part in decisions regarding environmental policy. We are urged to plant trees to reverse the "greenhouse effect." Real estate developers are obligated to restore previously damaged acreage in exchange for building permits.¹ The U.S. National Park Service spends \$33 million to "rehabilitate" 39,000 acres of the Redwood Creek watershed.² And the U.S. Forest Service is criticized for its "plantation" mentality: it is harvesting trees from old-growth forests rather than "redesigning" forests according to the sustainable principles of nature. "Restoration forestry is the only true forestry," claims an environmentally conscious former employee of the Bureau of Land Management.³

These policies present the message that humanity should repair the damage that human intervention has caused the natural environment. The message is an optimistic one, for it implies that we recognize the harm we have caused in the natural environment and that we possess the means and will to correct these harms. These

policies also make us feel good; the prospect of restoration relieves the guilt we feel about the destruction of nature. The wounds we have inflicted on the natural world are not permanent; nature can be made "whole" again. Our natural resource base and foundation for survival can be saved by the appropriate policies of restoration, regeneration, and redesign.

It is also apparent that these ideas are not restricted to policymakers, environmentalists, or the general public – they have begun to pervade the normative principles of philosophers concerned with developing an adequate environmental ethic. Paul Taylor uses a concept of "restitutive justice" both as one of the basic rules of duty in his biocentric ethic and as a "priority principle" to resolve competing claims.⁴ The basic idea of this rule is that human violators of nature will in some way repair or compensate injured natural entities and systems. Peter Wenz also endorses a principle of restitution as being essential to an adequate theory of environmental ethics; he then attacks Taylor's theory for not presenting a coherent principle.⁵ The idea that humanity is morally responsible for reconstructing natural areas and entities – species, communities, ecosystems – thus becomes a central concern of an applied environmental ethic.

In this essay I question the environmentalists' concern for the restoration of nature and argue against the optimistic view that humanity has the obligation and ability to repair or reconstruct dam-

aged natural systems. This conception of environmental policy and environmental ethics is based on a misperception of natural reality and a misguided understanding of the human place in the natural environment. On a simple level, it is the same kind of "technological fix" that has engendered the environmental crisis. Human science and technology will fix, repair, and improve natural processes. On a deeper level, it is an expression of an anthropocentric world view, in which human interests shape and redesign a comfortable natural reality. A "restored" nature is an artifact created to meet human satisfactions and interests. Thus, on the most fundamental level, it is an unrecognized manifestation of the insidious dream of the human domination of nature. Once and for all, humanity will demonstrate its mastery of nature by "restoring" and repairing the degraded ecosystems of the biosphere. Cloaked in an environmental consciousness, human power will reign supreme.

II

It has been many years since Robert Elliot published his sharp and accurate criticism of "the restoration thesis."⁶ In an article entitled "Faking Nature," Elliot examined the moral objections to the practical environmental policy of restoring damaged natural systems, locations, and landscapes. For the sake of argument, Elliot assumed that the restoration of a damaged area could be recreated perfectly, so that the area would appear in its original condition after the restoration was completed. He then argued that the perfect copy of the natural area would be of less value than the original, for the newly restored natural area would be analogous to an art forgery. Two points seem crucial to Elliot's argument. First, the value of objects can be explained "in terms of their origins, in terms of the kinds of processes that brought them into being."⁷ We value an art work in part because of the fact that a particular artist, a human individual, created the work at a precise moment in historical time. Similarly, we value a natural area because of its "special kind of continuity with the past." But to understand the art work or the natural area in its historical context we require a special kind of insight or knowledge. Thus, the second crucial point of Elliot's argument is the co-existence of "understanding and evaluation." The art expert brings to the analysis and evaluation of a

work of art a full range of information about the artist, the period, the intentions of the work, and so on. In a similar way, the evaluation of a natural area is informed by a detailed knowledge of ecological processes, a knowledge that can be learned as easily as the history of art.⁸ To value the restored landscape as much as the original is thus a kind of ignorance; we are being fooled by the superficial similarities to the natural area, just as the ignorant art "appreciator" is fooled by the appearance of the art forgery.

Although Elliot's argument has had a profound effect on my own thinking about environmental issues, I believed that the problem he uses as a starting point is purely theoretical, almost fanciful.⁹ After all, who would possibly believe that a land developer or a strip mining company would actually restore a natural area to its original state? Elliot himself claims that "the restoration thesis" is generally used "as a way of undermining the arguments of conservationists."¹⁰ Thus it is with concern that I discover that serious environmentalist thinkers, as noted above, have argued for a position similar to Elliot's "restoration thesis." The restoration of a damaged nature is seen not only as a practical option for environmental policy but also as a moral obligation for right-thinking environmentalists. If we are to continue human projects which (unfortunately) impinge on the natural environment (it is claimed), then we must repair the damage. In a few short years a "sea-change" has occurred: what Elliot attacked as both a physical impossibility and a moral mistake is now advocated as proper environmental policy. Am I alone in thinking that something has gone wrong here?

Perhaps not enough people have read Elliot's arguments; neither Taylor nor Wenz, the principal advocates of restitutive environmental justice, list this article in their notes or bibliographies. Perhaps we need to re-examine the idea of re-creating a natural landscape; in what sense is this action analogous to an art forgery? Perhaps we need to push beyond Elliot's analysis, to use his arguments as a starting point for a deeper investigation into the fundamental errors of restoration policy.

III

My initial reaction to the possibility of restoration policy is almost entirely visceral: I am outraged by the idea that a technologically created "nature"

will be passed off as reality. The human presumption that we are capable of this technological fix demonstrates (once again) the arrogance with which humanity surveys the natural world. Whatever the problem may be, there will be a technological, mechanical, or scientific solution. Human engineering will modify the secrets of natural processes and effect a satisfactory result. Chemical fertilizers will increase food production; pesticides will control disease-carrying insects; hydroelectric dams will harness the power of our rivers. The familiar list goes on and on.

The relationship between this technological mind-set and the environmental crisis has been amply demonstrated, and need not concern us here.¹¹ My interest is narrower. I want to focus on the creation of artifacts, for that is what technology does. The re-created natural environment that is the end result of a restoration project is nothing more than an artifact created for human use. The problem for an applied environmental ethic is the determination of the moral value of this artifact.

Recently, Michael Losonsky has pointed out how little we know about the nature, structure, and meaning of artifacts. "[C]ompared to the scientific study of nature, the scientific study of artifacts is in its infancy."¹² What is clear, of course, is that an artifact is not equivalent to a natural object; but the precise difference, or set of differences, is not readily apparent. Indeed, when we consider objects such as beaver dams, we are unsure if we are dealing with natural objects or artifacts. Fortunately, however, these kinds of animal-created artifacts can be safely ignored in the present investigation. Nature restoration projects are obviously human. A human built dam is clearly artificial.

The concepts of function and purpose are central to an understanding of artifacts. Losonsky rejects the Aristotelian view that artifacts (as distinguished from natural objects) have no inner nature or hidden essence that can be discovered. Artifacts have a "nature" that is partially comprised of three features: "internal structure, purpose, and manner of use." This nature, in turn, explains why artifacts "have predictable lifespans during which they undergo regular and predictable changes."¹³ The structure, function, and use of the artifacts determine to some extent the changes which they undergo. Clocks would not develop in a manner which prevented the measurement of time.

Natural objects lack the kind of purpose and function found in artifacts. As Andrew Brennan has argued, natural entities have no "intrinsic functions," as he calls them, for they were not the result of design. They were not created for a particular purpose; they have no set manner of use. Although we often speak as if natural individuals (for example, predators) have roles to play in ecosystemic well-being (the maintenance of optimum population levels), this kind of talk is either metaphorical or fallacious. No one created or designed the mountain lion as a regulator of the deer population.¹⁴

This is the key point. Natural individuals were not designed for a purpose. They lack intrinsic functions, making them different from human-created artifacts. Artifacts, I claim, are essentially anthropocentric. They are created for human use, human purpose – they serve a function for human life. Their existence is centered on human life. It would be impossible to imagine an artifact not designed to meet a human purpose. Without a foreseen use the object would not be created. This is completely different from the way natural entities and species evolve to fill ecological niches in the biosphere.

The doctrine of anthropocentrism is thus an essential element in understanding the meaning of artifacts. This conceptual relationship is not generally problematic, for most artifacts are human creations designed for use in human social and cultural contexts. But once we begin to re-design natural systems and processes, once we begin to create restored natural environments, we impose our anthropocentric purposes on areas that exist outside human society. We will construct so-called natural objects on the model of human desires, interests, and satisfactions. Depending on the adequacy of our technology, these restored and redesigned natural areas will appear more or less natural, but they will never be natural – they will be anthropocentrically designed human artifacts.

A disturbing example of this conceptual problem applied to environmental policy can be found in Chris Maser's *The Redesigned Forest*. Maser is a former research scientist for the United States Department of Interior Bureau of Land Management. His book attests to his deeply felt commitment to the policy of "sustainable" forestry, as opposed to the short-term expediency of present-day forestry practices. Maser argues for a forestry policy that "restores" the forest as it

harvests it; we must be true foresters and not "plantation" managers.

Nonetheless, Maser's plans for "redesigning" forests reveal several problems about the concepts and values implicit in restoration policy. First, Maser consistently compares the human design of forests with Nature's design. The entire first chapter is a series of short sections comparing the two "designs." In the "Introduction," he writes, "[W]e are redesigning our forests from Nature's blueprint to humanity's blueprint."¹⁵ But Nature, of course, does not have a blueprint, nor a design. As a zoologist, Maser knows this, but his metaphorical talk is dangerous. It implies that we can discover the plan, the methods, the processes of nature, and mold them to our purposes.

Maser himself often writes as if he accepts that implication. The second problem with his argument is the comparison of nature to a mechanism that we do not fully understand. The crucial error we make in simplifying forest ecology – turning forests into plantations – is that we are assuming our design for the forest mechanism is better than nature's. "Forests are not automobiles in which we can tailor artificially substituted parts for original parts."¹⁶ How true. But Maser's argument against this substitution is empirical: "A forest cannot be 'rebuilt' and remain the same forest, but we could probably rebuild a forest similar to the original if we knew how. No one has ever done it. . . . [W]e do not have a parts catalog, or a maintenance manual. . . ."¹⁷ The implication is that if we did have a catalog and manual, if nature were known as well as artifactual machines, then the restoration of forests would be morally and practically acceptable. This conclusion serves as Maser's chief argument for the preservation of old-growth and other unmanaged forests: "We have to maintain some original, unmanaged old-growth forest, mature forest, and young-growth forest as parts catalog, maintenance manual, and service department from which to learn to practice restoration forestry."¹⁸ Is the forest-as-parts-catalog a better guiding metaphor than the forest-as-plantation?

This mechanistic conception of nature underlies, or explains, the third problem with Maser's argument. His goal for restoration forestry, his purpose in criticizing the short-term plantation mentality, is irredeemably anthropocentric. The problem with present-day forestry practices is that they are "exclusive of all other human values except production of fast-grown wood fiber."¹⁹ It

is the elimination of other human values and interests that concerns Maser. "We need to learn to see the forest as the factory that produces raw materials. . . ." to meet our "common goal[. . .] a sustainable forest for a sustainable industry for a sustainable environment for a sustainable human population."²⁰ Restoration forestry is necessary because it is the best method for achieving the human goods which we extract from nature. Our goal is to build a better "factory-forest," using the complex knowledge of forest ecology.

What is disturbing about Maser's position is that it comes from an environmentalist. Unlike Elliot's theoretical opponents of conservation, who wished to subvert the environmentalist position with the "restoration thesis," Maser advocates the human design of forests as a method of environmental protection and conservation for human use. His conclusion shows us the danger of using anthropocentric and mechanistic models of thought in the formulation of environmental policy. These models leave us with forests that are "factories" for the production of human commodities, spare-parts catalogs for the maintenance of the machine.

But Maser's view can be considered an extreme version of restoration thinking. Is Steve Packard's work with The Nature Conservancy a better expression of the underlying principles and values of restoration policy?²¹ Is Packard's work more aligned with natural processes? Is it less technological, artifactual, and anthropocentric? Unfortunately not: even this more benign and less interventionist project of ecological restoration is based on problematic assumptions about the management of nature.

Packard describes the research and actions undertaken to rediscover and restore the tallgrass savanna or oak opening community of the Midwest. As he relates, the rediscovery of the savanna was an accidental by-product of a different project, the restoration of prairie landscapes which included a bur oak edge. Involving seven small sites with degraded "prairies," the project entailed the enlargement of the areas by clearing brush and planting prairie species in its place. "Our objective was clear," he writes. "It was to restore these tracts to their original natural condition."

But how was this goal achieved? Packard asserts that he wanted to use "natural forces" such as fire to clear the brush; but this methodology is soon abandoned: "the question was, did we have

enough determination and patience to give natural processes two or three hundred years to work themselves out? Or could we find something quicker?" Thus, he writes, "we decided to leapfrog the persistent brushy border and to recut our fire lines. . . ." Although Packard is using the natural force of fire, he is employing it in an artificially accelerated manner to achieve the desired results more quickly. A similar process is used when the "seeding process" begins: naturally occurring seeds are used, but the process involves the preparation of a "savanna mix," and human decisions regarding the placement and release of the seeds.

Although I have nothing but admiration for Packard's work, and I sincerely applaud his success, the significant philosophical lesson from his restoration project is that even such a "benign" and minimal intervention compromises the natural integrity of the system being restored. Despite his goal of restoring an original natural condition, Packard is actually creating an artifactual substitute for the real savanna, one based on human technologies and designed for human purposes: a pure and grand vision of the old Midwest. The most telling passage in his chronicle of the savanna restoration is his report of the "farsighted" 1913 law which established the Forest Preserve District, a law whose statement of purpose "emboldened" Packard to accelerate the burning process. He quotes the law, with emphasis added: "to *restore*, restock, protect and preserve the natural forests and said lands . . . as nearly as may be, in their natural state and condition, for the purpose of the education, pleasure, and recreation of the public." Note that the purpose of the preservation and restoration is the production of human goods; as with all artifacts, the goal is a human benefit. Packard calls this a "noble statement." Clearly the aim of restoration is the creation of environments that are pleasing to the human population. If the restoration is done well, as in the case of Packard's savannas, the area may appear natural; but it will not be natural, since it is the result of a technological acceleration of natural forces.

I began this section with a report of my visceral reaction to the technological re-creation of natural environments. This reaction has now been explained and analyzed. Nature restoration projects are the creations of human technologies, and as such, are artifacts. But artifacts are essentially the constructs of an anthropocentric world view. They

are designed by humans for humans to satisfy human interests and needs. Artifactual restored nature is thus fundamentally different from natural objects and systems which exist without human design. It is not surprising, then, that we view restored nature with a value different from the original.

IV

To this point, my analysis has supported the argument and conclusions of Elliot's criticism of "the restoration thesis." But further reflection on the nature of artifacts, and the comparison of forests to well run machines, makes me doubt the central analogy which serves as the foundation of his case. Can we compare an undisturbed natural environment to a work of art? Should we?

As noted in Section II, Elliot uses the art/nature analogy to make two fundamental points about the process of evaluation: (1) the importance of a continuous causal history; and (2) the use of knowledge about this causal history to make appropriate judgments. A work of art or a natural entity which lacks a continuous causal history, as understood by the expert in the field, would be judged inferior. If the object is "passed off" as an original, with its causal history intact, then we would judge it to be a forgery or an instance of "faked" nature.

I do not deny that this is a powerful analogy. It demonstrates the crucial importance of causal history in the analysis of value. But the analogy should not be pushed too far, for the comparison suggests that we possess an understanding of art forgery that is now simply being applied to natural objects. I doubt that our understanding of art forgery is adequate for this task. L. B. Cebik argues that an analysis of forgery involves basic ontological questions about the meaning of art. Cebik claims that it is a mistake to focus exclusively on questions of value when analyzing art forgeries, for the practice of forgery raises fundamental issues about the status of art itself.²²

According to Cebik, an analysis of forgeries demonstrates that our understanding of art is dominated by a limiting paradigm — "production by individuals." We focus almost exclusively on the individual identity of the artist as the determining factor in assessing authenticity. "Nowhere . . . is there room for paradigmatic art being fluid, unin-

ished, evolving, and continuous in its creation." Cebik has in mind a dynamic, communally based art, an ever-changing neighborhood mural or music passed on for generations.²³ Another example would be classical ballet, a performance of which is a unique dynamic movement, different from every other performance of the same ballet.

These suggestions about a different paradigm of art show clearly, I think, what is wrong with the art/nature analogy as a useful analytical tool. Natural entities and systems are much more akin to the fluid evolving art of Cebik's alternative model than they are to the static, finished, individual artworks of the dominant paradigm. It is thus an error to use criteria of forgery and authenticity that derive from an individualistic, static conception of art for an evaluation of natural entities and systems. Natural entities and systems are nothing like static, finished objects of art. They are fluid, evolving systems which completely transcend the category of artist or creator. The perceived disvalue in restored natural objects does not derive from a misunderstanding over the identity of the creator of the objects. It derives instead from the misplaced category of "creator" – for natural objects do not have creators or designers as human artworks do. Once we realize that the natural entity we are viewing has been "restored" by a human artisan it ceases to be a natural object. It is not a forgery; it is an artifact.

We thus return to artifacts, and their essential anthropocentric nature. We cannot (and should not) think of natural objects as artifacts, for this imposes a human purpose or design on their very essence. As artifacts, they are evaluated by their success in meeting human interests and needs, not by their own intrinsic being. Using the art/nature analogy of forgery reinforces the impression that natural objects are similar to artifacts – artworks – and that they can be evaluated using the same anthropocentric criteria. Natural entities have to be evaluated on their own terms, not as artworks, machines, factories, or any other human-created artifact.

V

But what are the terms appropriate for the evaluation of natural objects? What criteria should be used? To answer this question we need to do more than differentiate natural objects from artifacts; we need to examine the essence or nature of natural

objects. What does it mean to say that an entity is natural (and hence, not an artifact)? Is there a distinguishing mark or characteristic that determines the descriptive judgment? What makes an object natural, and why is the standard not met through the restoration process?

The simple answer to this question – a response I basically support – is that the natural is defined as being independent of the actions of humanity. Thus, Taylor advocates a principle of noninterference as a primary moral duty in his ethic of respect for nature. "[W]e put aside our personal likes and our human interests. . . . Our respect for nature means that we acknowledge the sufficiency of the natural world to sustain its own proper order throughout the whole domain of life."²⁴ The processes of the natural world that are free of human interference are the most natural.

There are two obvious problems with this first simple answer. First, there is the empirical point that the human effect on the environment is, by now, fairly pervasive. No part of the natural world lies untouched by our pollution and technology. In a sense, then, nothing natural truly exists (any more). Second, there is the logical point that humans themselves are naturally evolved beings, and so all human actions would be "natural," regardless of the amount of technology used or the interference on nonhuman nature. The creation of artifacts is a natural human activity, and thus the distinction between artifact and natural object begins to blur.

These problems in the relationship of humanity to nature are not new. Mill raised similar objections to the idea of "nature" as a moral norm over a hundred years ago, and I need not review his arguments.²⁵ The answer to these problems is twofold. First, we admit that the concepts of "natural" and "artificial" are not absolutes; they exist along a spectrum, where various gradations of both concepts can be discerned. The human effect on the natural world is pervasive, but there are differences in human actions that make a descriptive difference. A toxic waste dump is different from a compost heap of organic material. To claim that both are equally non-natural would obscure important distinctions.

A second response is presented by Brennan.²⁶ Although a broad definition of "natural" denotes independence from human management or interference, a more useful notion (because it has implications for value theory and ethics) can be

derived from the consideration of evolutionary adaptations. Our natural diet is the one we are adapted for, that is "in keeping with our nature." All human activity is not unnatural, only that activity which goes beyond our biological and evolutionary capacities. As an example, Brennan cites the procedure of "natural childbirth," that is, childbirth free of technological medical interventions. "Childbirth is an especially striking example of the wildness within us . . . where we can appreciate the natural at first hand. . . ." It is natural, free, and wild not because it is a nonhuman activity – after all, it is human childbirth – but because it is independent of a certain type of human activity, actions designed to control or to manipulate natural processes.

The "natural" then is a term we use to designate objects and processes that exist as far as possible from human manipulation and control. Natural entities are autonomous in ways that human-created artifacts are not; as Taylor writes, "to be free to pursue the realization of one's good according to the laws of one's nature."²⁷ When we thus judge natural objects, and evaluate them more highly than artifacts, we are focusing on the extent of their independence from human domination. In this sense, then, human actions can also be judged to be natural – these are the human actions that exist as evolutionary adaptations, free of the control and alteration of technological processes.

If these reflections on the meaning of "natural" are plausible, then it should be clear why the restoration process fails to meet the criteria of naturalness. The attempt to redesign, recreate, and restore natural areas and objects is a radical intervention in natural processes. Although there is an obvious spectrum of possible restoration and redesign projects which differ in their value – Maser's redesigned sustainable forest is better than a tree plantation – all of these projects involve the manipulation and domination of natural areas. All of these projects involve the creation of artifactual natural realities, the imposition of anthropocentric interests on the processes and objects of nature. Nature is not permitted to be free, to pursue its own independent course of development.

The fundamental error is thus domination, the denial of freedom and autonomy. Anthropocentrism, the major concern of most environmental philosophers, is only one species of the more basic attack on the preeminent value of self-realization.

From within the perspective of anthropocentrism, humanity believes it is justified in dominating and molding the nonhuman world to its own human purposes. But a policy of domination transcends the anthropocentric subversion of natural processes. A policy of domination subverts both nature and human existence; it denies both the cultural and natural realization of individual good, human and nonhuman. Liberation from all forms of domination is thus the chief goal of any ethical or political system.

It is difficult to awaken from the dream of domination. We are all impressed by the power and breadth of human technological achievements. Why is it not possible to extend this power further, until we control, manipulate, and dominate the entire natural universe? This is the illusion that the restoration of nature presents to us. But it is only an illusion. Once we dominate nature, once we restore and redesign nature for our own purposes, then we have destroyed nature – we have created an artifactual reality, in a sense, a false reality, which merely provides us the pleasant illusory appearance of the natural environment.

VI

As a concluding note, let me leave the realm of philosophical speculation and return to the world of practical environmental policy. Nothing I have said in this essay should be taken as an endorsement of actions that develop, exploit, or injure areas of the natural environment and leave them in a damaged state. I believe, for example, that Exxon should attempt to clean up and restore the Alaskan waterways and land that was harmed by its corporate negligence. The point of my argument here is that we must not misunderstand what we humans are doing when we attempt to restore or repair natural areas. We are not restoring nature; we are not making it whole and healthy again. Nature restoration is a compromise; it should not be a basic policy goal. It is a policy that makes the best of a bad situation; it cleans up our mess. We are putting a piece of furniture over the stain in the carpet, for it provides a better appearance. As a matter of policy, however, it would be much more significant to prevent the causes of the stains.

Notes

- 1 In Islip Town, New York, real-estate developers have cited the New York State Department of Environmental Conservation policy of "no-net loss" in proposing the restoration of parts of their property to a natural state, in exchange for permission to develop. A report in *Newsday* discusses a controversial case: "In hopes of gaining town-board approval, Blankman has promised to return a three-quarter-mile dirt road on his property to its natural habitat...." Katti Gray, "Wetlands in the Eye of a Storm," *Islip Special, Newsday*, April 22, 1990; pp. 1, 5.
- 2 *Garbage: The Practical Journal for the Environment*, May/June 1990, rear cover.
- 3 Chris Maser, *The Redesigning Forest* (San Pedro, Calif.: R. & E. Miles, 1988), p. 173. It is also interesting to note that there now exists a dissident group within the U.S. Forest Service, called the Association of Forest Service Employees for Environmental Ethics (AFSEEE). They advocate a return to sustainable forestry.
- 4 Paul Taylor, *Respect for Nature: A Theory of Environmental Ethics* (Princeton: Princeton University Press, 1986), pp. 186-92, 304-6, and ch. 4 and 6 generally.
- 5 Peter S. Wenz, *Environmental Justice* (Albany: SUNY Press, 1988), pp. 287-91.
- 6 Robert Elliot, "Faking Nature," *Inquiry* 25 (1982): 81-93; reprinted in Donald VanDeVeer and Christine Pierce, eds., *People, Penguins, and Plastic Trees: Basic Issues in Environmental Ethics* (Belmont, Calif.: Wadsworth, 1986), pp. 142-50.
- 7 *Ibid.*, p. 86 (VanDeVeer and Pierce, p. 145).
- 8 *Ibid.*, p. 91 (VanDeVeer and Pierce, p. 149).
- 9 Eric Katz, "Organism, Community, and the 'Substitution Problem,'" *Environmental Ethics* 7 (1985): 253-5.
- 10 Elliot, p. 81 (VanDeVeer and Pierce, p. 142).
- 11 See, for example, Barry Commoner, *The Closing Circle* (New York: Knopf, 1971) and Arnold Pacey, *The Culture of Technology* (Cambridge, MA: MIT Press, 1983).
- 12 Michael Losonsky, "The Nature of Artifacts," *Philosophy* 65 (1990): 88.
- 13 *Ibid.*, p. 84.
- 14 Andrew Brennan, "The Moral Standing of Natural Objects," *Environmental Ethics* 6 (1984): 41-4.
- 15 Maser, *The Redesigning Forest*, p. xvii.
- 16 *Ibid.*, pp. 176-7.
- 17 *Ibid.*, pp. 88-9.
- 18 *Ibid.*, p. 174.
- 19 *Ibid.*, p. 94.
- 20 *Ibid.*, pp. 148-9.
- 21 Steve Packard, "Just a Few Oddball Species: Restoration and the Rediscovery of the Tallgrass Savanna," *Restoration and Management Notes* 6:1 (Summer 1988): 13-22.
- 22 L. B. Cebik, "Forging Issues from Forged Art," *Southern Journal of Philosophy* 27 (1989): 331-46.
- 23 *Ibid.*, p. 342.
- 24 Taylor, *Respect for Nature*, p. 177. The rule of non-interference is discussed on pp. 173-9.
- 25 J. S. Mill, "Nature," in *Three Essays on Religion* (London: 1874).
- 26 Andrew Brennan, *Thinking About Nature: An Investigation of Nature, Value, and Ecology* (Athens: University of Georgia Press, 1988), pp. 88-91.
- 27 Taylor, *Respect for Nature*, p. 174.